



Armed Forces College of Medicine AFCM



Digestion and absorption along the GIT 2

Ass. Prof. Dalia Abd Elsalam Saad

INTENDED LEARNING OBJECTIVES (ILO)

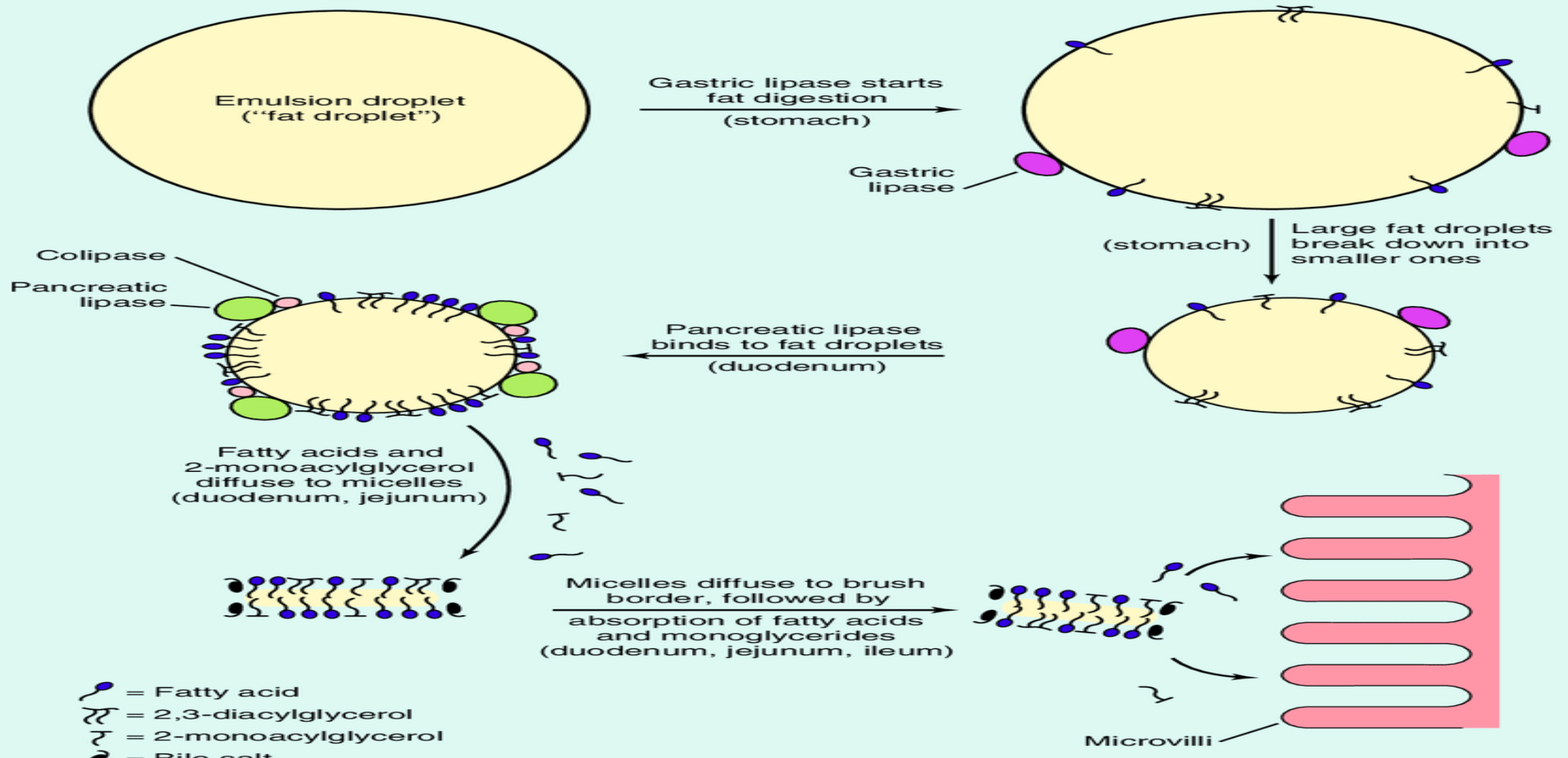


By the end of this lecture the student will be able to:

- 1. Summarize the digestion and mechanism of absorption of different nutrients (fate, minerals, vitamins) along GIT (transport carriers)**
- 2. Explain the Factors affecting intestinal absorption**
- 3. Summarize the daily water turnover (mL) in the gastrointestinal tract**
- 4. Apply knowledge to solve clinical problem**

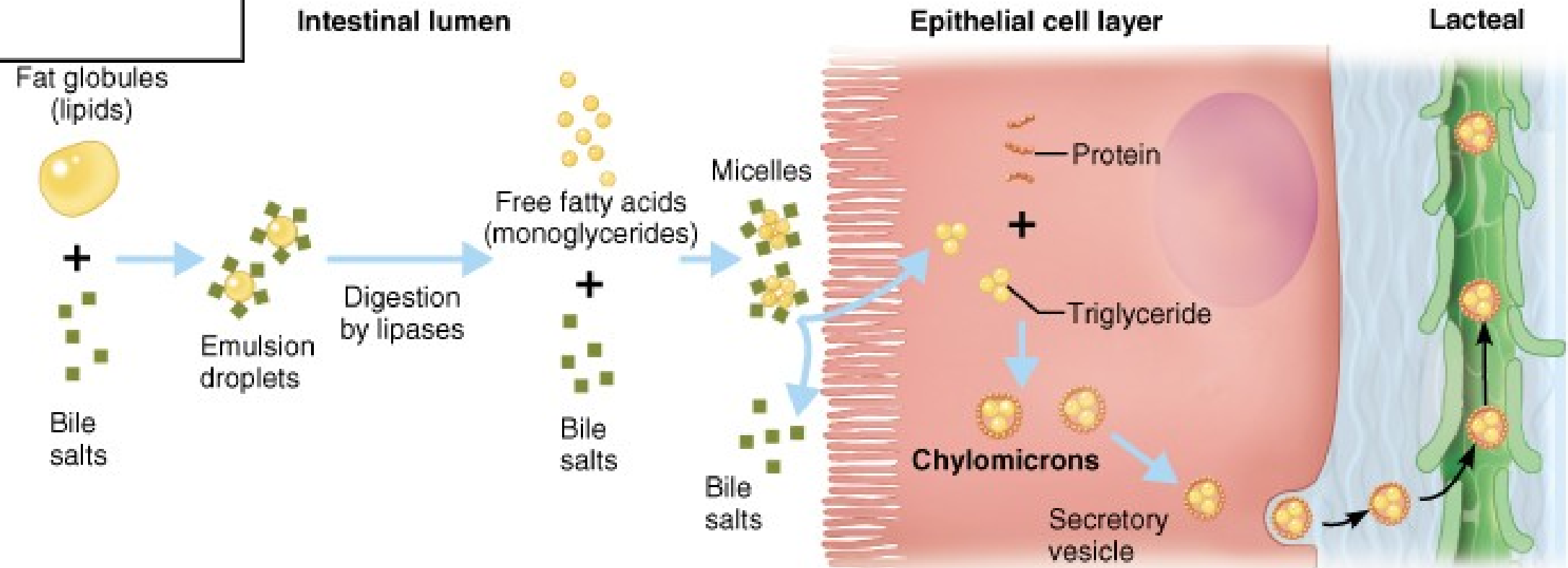


Digestion of fat





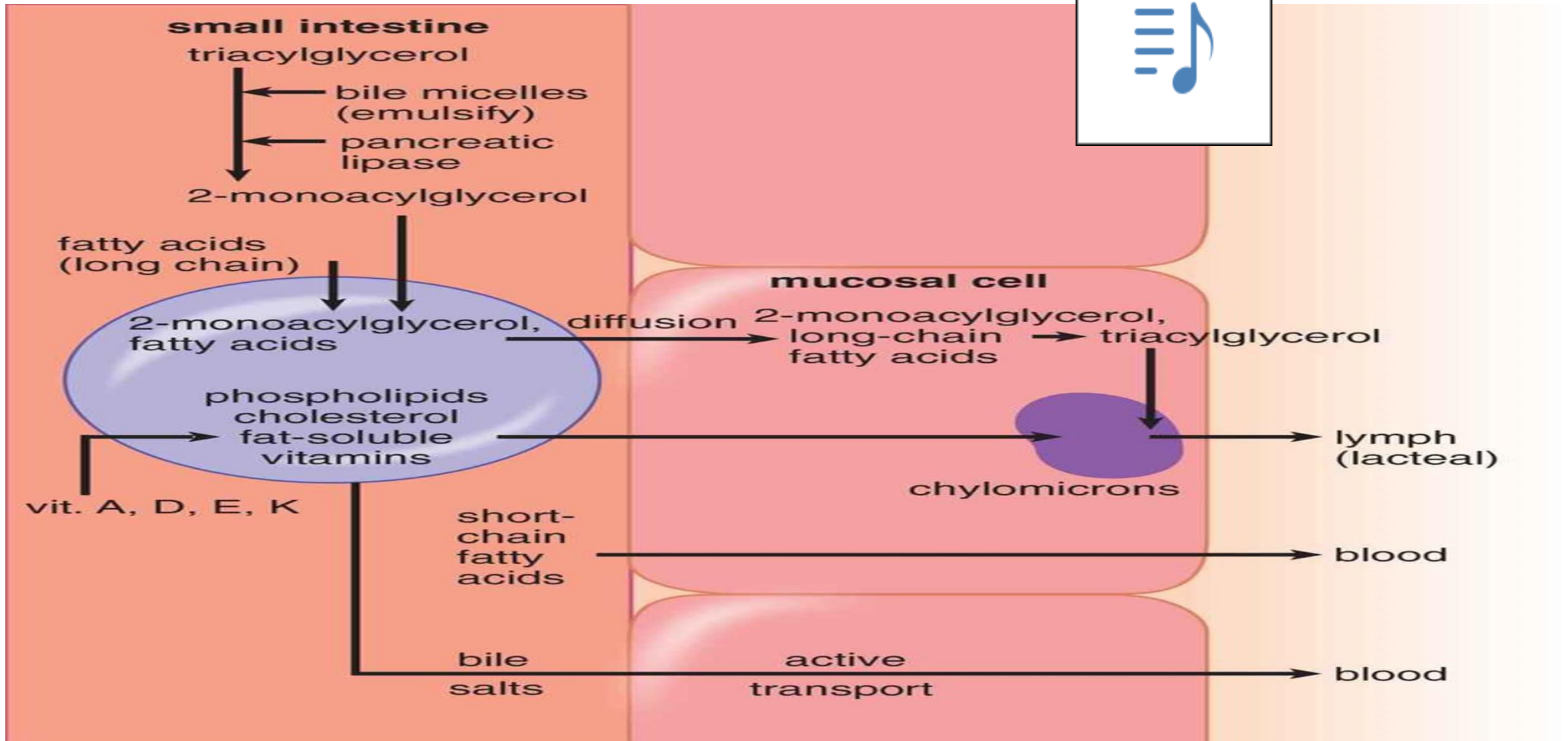
Digestion of fat



QTOTK

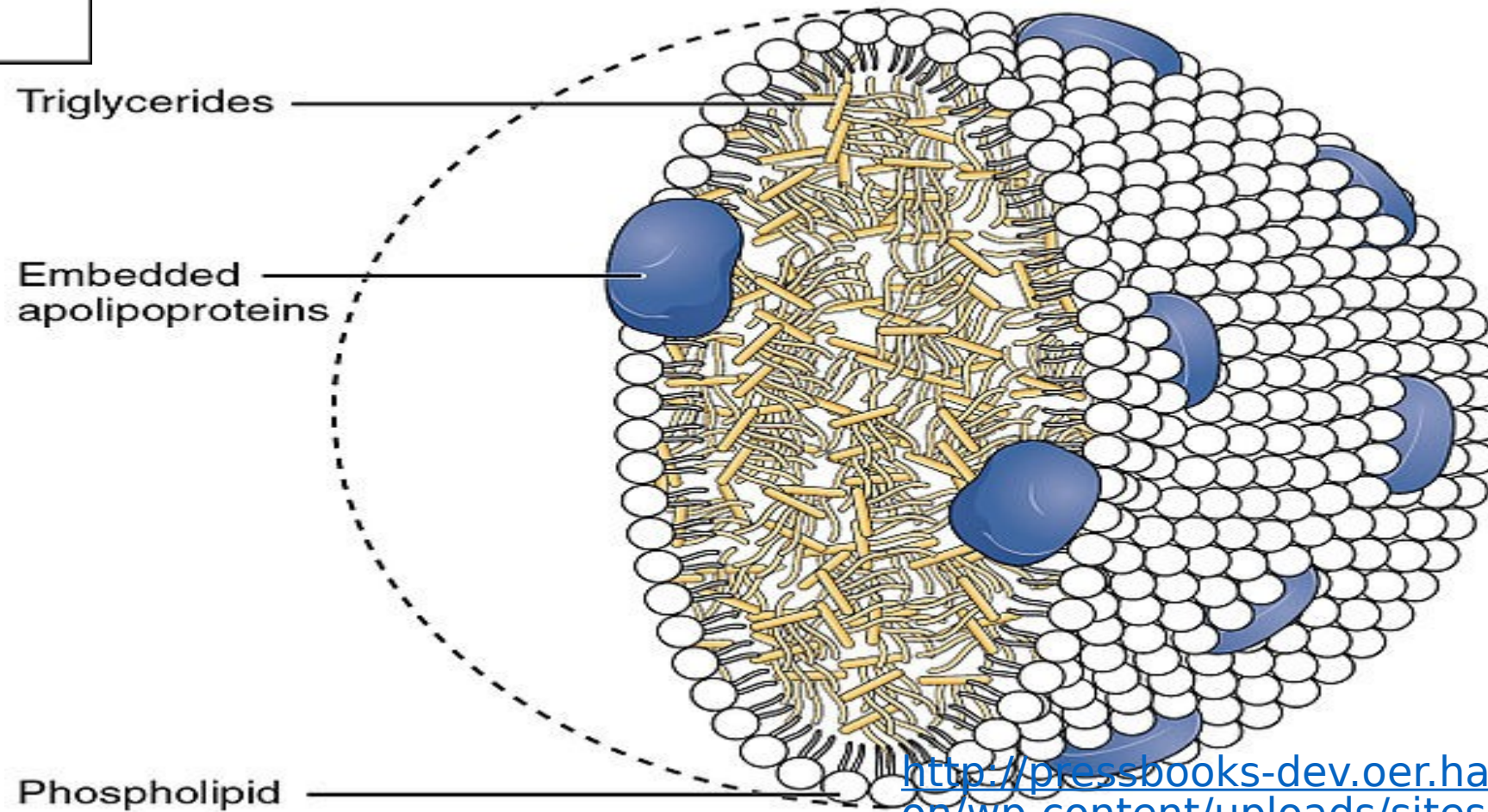
Copyright © 2001 Benjamin Cummings, an imprint of Addison Wesley Longman, Inc.

Fat absorption





Chylomicrones



<http://pressbooks-dev.oer.hawaii.edu/humannutrition/wp-content/uploads/sites/10/2017/12/image11.png>



Digestion and absorption of nucleic acid



Nucleic acid digestion

Foodstuff	Enzyme(s) and source	Site of action	Path of absorption
Nucleic acids			
	Pancreatic ribonuclease and deoxyribonuclease	Small intestine	
	Brush border enzymes (nucleosidases and phosphatases)	Small intestine	
Pentose sugars, N-containing bases, phosphate ions			• Subunits are absorbed into capillary blood in the villi and transported to the liver via the hepatic portal vein.

de_1

Draw a diagram showing digestion and absorption of a piece of meat ?

How many substances you are going to discuss??



Absorption of ions and minerals



Water “ osmotic pressure”

Minerals “All along small intestine”

Sodium “Na⁺” : actively &...??.... “sodium cotransport”

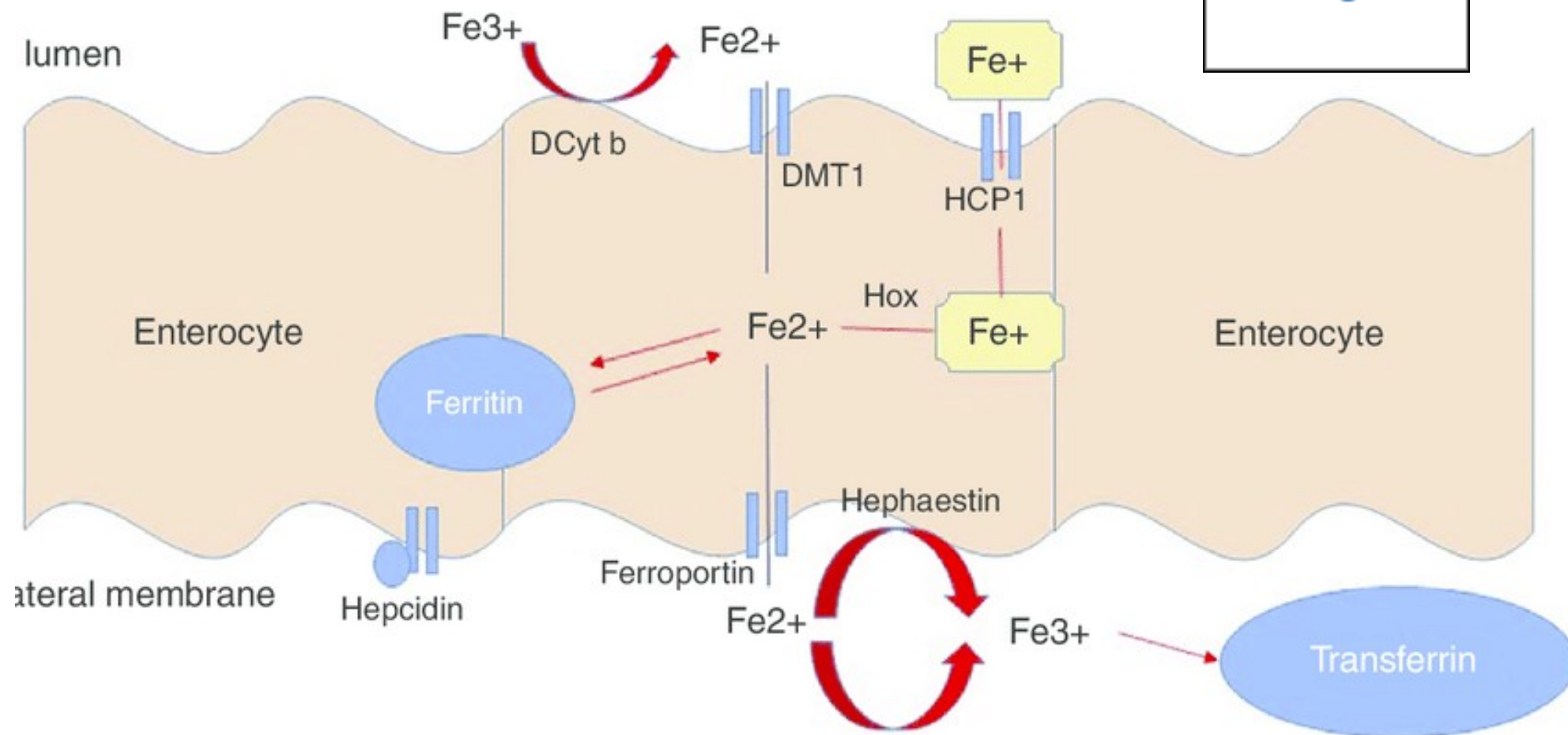
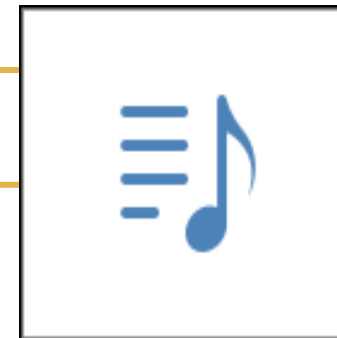
Chloride ion “cl⁻” : actively “In ileum”

Calcium “Ca⁺⁺” : actively “mostly in upper part of small intestine”

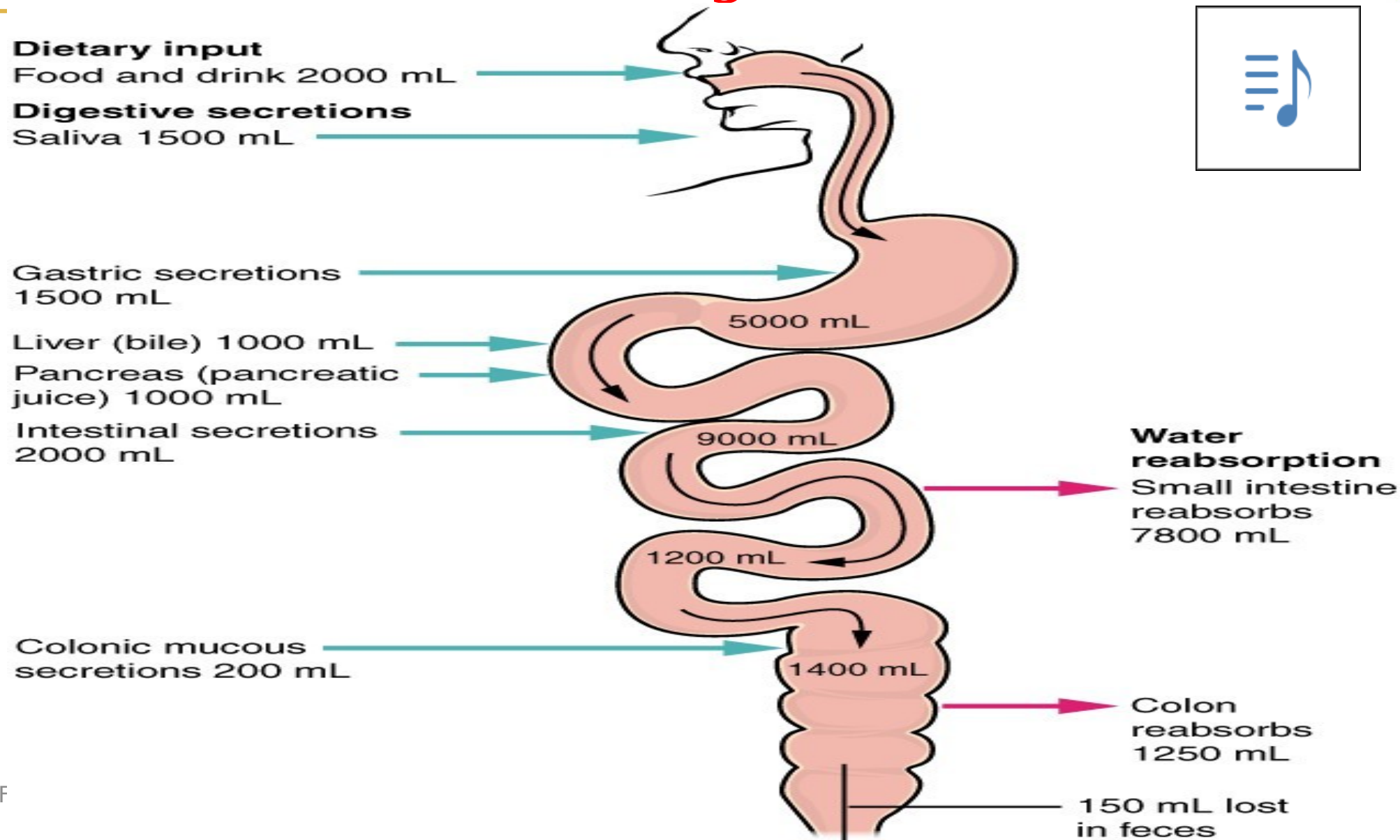
Potassium K⁺ Mostly by simple diffusion & Little by active.....

Iron “Almost in the duodenum” ?? DMT1

Absorption of Iron



Water turnover in the gastrointestinal tract



Daily water turnover (mL) in the gastrointestinal tract

INPUT OF WATER IN THE GIT			
<i>Ingested water</i>	2000 ml		
<i>Endogenous secretions</i>	7000		
Salivary glands	1500		
Stomach	2500		
Bile	500		
Pancreas	1500		
Intestine	+1000		
	7000		
Total input			9000
<i>Reabsorbed</i>			8800
Jejunum	5500		
Ileum	2000		
Colon	+1300		
Total	8800		
<i>Balance in stool</i>	200		



Absorption of vitamins



Vitamins
“unchanged”

Most “in upper part
of small intestine”

Vitamin B12 “in
ileum”

Vitamin B 12 &
folate absorption
are Na^+ -
independent

The remaining
water-soluble
vitamins need
carriers
“ Na^+ +
cotransporters”

Water soluble
vitamins faster than
fat soluble vitamins

Factors affecting intestinal absorption



1) Vitality of intestinal mucosa

2) State of digestion

3) Bile salts & lymph flow

4) Duration of contact of food to intestinal mucosa


5) Intestinal mixing movements

6) Surface area available for absorption

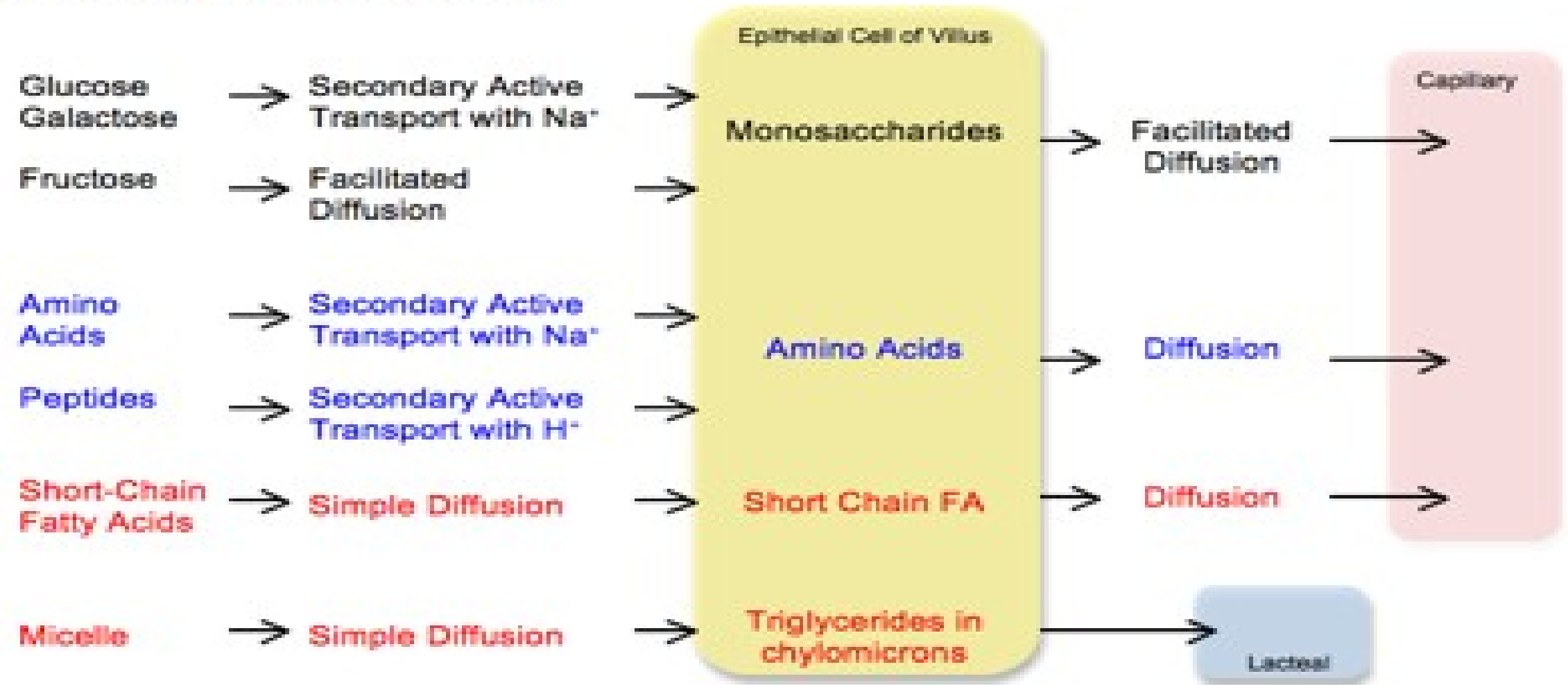
7) Movements of the villi

8) Physico-chemical factors:-

Summary



Absorption in the Small Intestine



Lecture Quiz



1) Water is absorbed in the jejunum, ileum, colon and excreted in feces. Arrange these in order of the amount of water; absorbed or excreted, from the greatest to the smallest.

- a) Colon, jejunum, ileum, feces.
- b) Feces, colon, ileum, jejunum.
- c) Jejunum, ileum, colon, feces.
- d) Colon, ileum, jejunum, feces.
- e) Feces, jejunum, ileum, colon.

C

2) Which deficiency in digestion or absorption is caused by a lack of bile salts?

- f) Lactose intolerance.
- g) Cystinuria.
- h) Secretory diarrhea.
- i) Deficiency in intestinal micelle formation.
- j) Lack of triglyceride breakdown.

d

SUGGESTED TEXTBOOKS



- 1) Ganong's "Review of Medical Physiology".**
- 2) Guyton and Hall "Textbook of Medical Physiology".**